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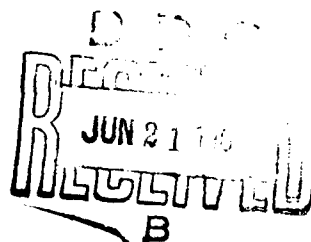
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OBSERVATIONS ON THE ROLE OF THE REACTIVITY
OF GREAT GERBILS TO P. PESTIS DURING
THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS

Translation No. 1678

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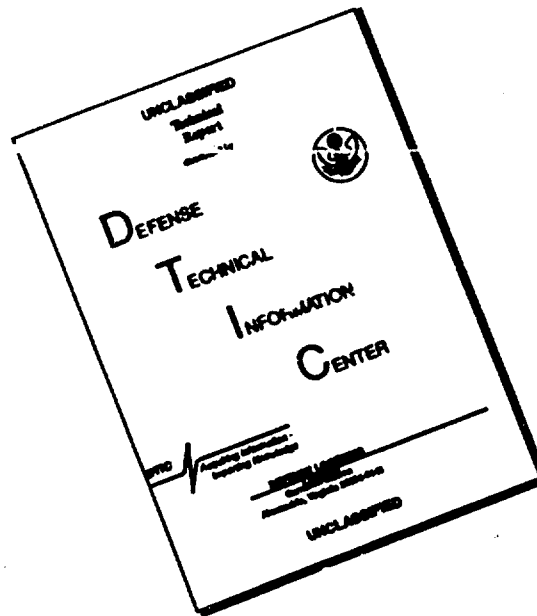


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OBSERVATIONS ON THE ROLE OF THE REACTIVITY
OF GREAT GERBILS TO *P. PESTIS* DURING
THE DEVELOPMENT OF THE EPIZOOTOLOGICAL PROCESS

Report III. Dynamics of the Hemagglutinins after a Remote Repeated Contact of the Great Gerbils with *P. pestis* (Alma-Ata; Taldy-Kurgan).

[Following is the translation of an article by L.A. Peysakhis, A.G. Stogova, N.F. Lopatina, N.A. Sukharnikova, and N.F. Tarakanov, published in the Russian-language periodical Materialy Nauchnoy Konferentsii po Prirodnoy Ochagovosti i Profilaktike Chumy (Materials from the Scientific Conference on the Natural Focality and Prophylaxis of Plague), Alma-Ata, Feb., 1963, pages 176--178. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

In an epizootic territory great gerbils may come in contact with the plague microbe more than once during the course of their lives. In connection with this, along with the study of the dynamics of hemagglutinins in great gerbils under the conditions of a single contact with the plague causative agent, we undertook the task of following this process with repeated contacts.

For carrying out this task, after six months (in June) following the initial infection of gerbils with various doses of the plague microbe (see Report II), we again infected all four groups of animals subcutaneously, but with the same dose of 10^3 microbial bodies. All told 80 gerbils were reinfected. The initial infection doses for these animals were: 10^1 - 23, 10^3 - 23, 10^5 - 17, 10^7 - 17. For the repeated infection we used the same strain of causative agent (No 31); the blood to be investigated for the presence of hemagglutinins was taken in the same periods as during the initial infection.

Following the repeated infection of gerbils of the first group (10^1) the hemagglutinins in individual animals appeared already in three days. Up to 23 days the percentage of positively reacting animals was equal to 10--20. The average titers fluctuated within the limits of 1:40 to 1:1280 with individual variations from 1:40 up to 1:10240. In the period from 28--33 days the antibodies in the blood of gerbils in this group disappeared and appeared again in 38 days. From this time up until 73 days antibodies were detected in the blood with average titers from 1:115 up to 1:235 and individual fluctuations from 1:40 up to 1:10240. The percentage of positively reacting gerbils varied from 30 up to 60 with a maximum in 43--65 days. After 73 days it was not possible to detect antibodies in the blood of the gerbils.

Following the repeated infection of the second group of gerbils (10^3) antibodies were also detected starting with three days. From this time and for 33 days a gradual increase in the percentage of positively reacting gerbils

was recorded (up to 70) by the 23rd day, and then a lowering by the 33rd day (10). The average titers in this period varied within the limits of 1:80--1:3388, and individuals - from 1:40 up to 1:40960. From 38 days a repeated rise in the percentage of positively reacting gerbils began, which was observed throughout the 55th day, and then a lowering by 85 days and the complete disappearance by the 105th day. The average titers were within the limits from 1:180 up to 1:380, with individual fluctuations from 1:20 up to 1:1280. In 63 days the average titer was lowered to 1:67 and maintained at this level up to 85 days, after which it disappeared.

Following the repeated infection of gerbils of the third group (10⁵) the reaction of the animals from the first days was expressed still more sharply. Thus, already on the third day in individual gerbils the titers of the antibodies reached 1:2560--1:5120. The increase in the percentage of positively reacting animals continued up to 12 days (83%), after which (up to 53 days) this index fluctuated within the limits of 75--100. The lowering of the percentage of positively reacting gerbils down to 12 took place by the 105th day. From the third day an increase of the average titers of antibodies was noted for 12 days, and by 15 days it reached 1:1995. Then for 53 days the average titers were high with a maximum of 1:2818. Individual titers varied within the limits of 1:80--1:40960. From 63 days a gradual lowering of the average titers to 1:112 was observed, and individual indices down to 1:80--1:160.

Following the repeated infection of the fourth group of gerbils, from the third day a high percentage (82) of positively reacting gerbils was observed, reaching 100 by 23 days. In this same period the maximum average titers, reaching 1:16220, were recorded. The gradual lowering of the titers of the antibodies to their complete disappearance took place by the 105th day.

An analysis of the results obtained permits the following conclusions to be made:

The remote repeated encounter of great gerbils with the plague microbe led to the vigorous production of antibodies already in the first days after infection. The average titers of antibodies exceeded by far those following the initial infection, and the complete disappearance of hemagglutinins from the blood of the animals came about in almost twice as long a period of time.

Following the repeated infection of gerbils in remote periods with the same dose of plague microbe, the peculiarities in the dynamics of development of antibodies were found in dependency on the magnitude of the initial infecting dose.

Following the repeated encounter of great gerbils with the plague causative agent, just as during the initial one, significant individual

variations were observed in the dynamics of antibodies. Thus, in the very same period along with gerbils which had an antibody titer of 1:40,960 it is possible to record animals with a titer of 1:80, and certain individuals did not react at all to the administration of the antigen for the entire period of the observations.

In the dynamics of the average and individual titers of antibodies in repeatedly infected gerbils in a whole number of cases their periodic lowering was recorded (right up to complete disappearance) with a subsequent new increase, sometimes up to very high indices. A similar phenomenon was even noted in a whole group of gerbils (initial infection dose 10^1) for 28--33 days. It is possible that this phenomenon should be regarded in the category of temporary immunological paralysis, setting in due to the overstraining of the systems which produce these antibodies.